

Curriculum Vitae

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Brief Bio

I hold a PhD in Nuclear Physics from Aarhus University, Denmark. For many years, I was a frequent visitor at large international accelerator laboratories such as CERN in Switzerland, leading a number experimental collaborations which have advanced our understanding of the nuclear processes that drive stellar evolution and shape our universe. Eager to put my knowledge and analytical skills to use in a more applied setting, I joined the MERIDIAN project in 2018. Based at the Institute for Big Data Analytics at Dalhousie University, Canada, my research now focuses on the development and application of novel analytical and computational methods for ocean science, with special emphasis on marine bioacoustics.

Employment History

2020–Present: Senior Staff Scientist at Institute for Big Data Analytics, Dalhousie University
2019–Present: Adjunct Professor at Faculty of Computer Science, Dalhousie University
2018–2020: Lead Acoustic Data Analyst at Institute for Big Data Analytics, Dalhousie University
2015–2018: Assistant Professor at Department of Physics and Astronomy, Aarhus University
2013–2015: Postdoc at Department of Physics and Astronomy, Aarhus University
2010–2013: Postdoc at TRIUMF

University Education

2006–2010: PhD Physics, Aarhus University
2005–2006: Fulbright student, University of Washington
2002–2005: BSc Physics and Mathematics, Aarhus University

Grants¹

2019–2022: DFO Ocean and Freshwater Science Contribution Grant – *Building Neural Networks for Classification of Killer Whale Calls*, \$0.96M (Co-P.I.)
2015–2018: The Villum Foundation Young Investigator Programme – *Nuclear Astrophysics at the Precision Frontier*, \$0.58M (P.I.)

Fellowships and Awards

2020–2021: Mitacs Accelerate Fellowship – *Identification of High-Frequency Periodic Acoustic Fish Tags With Deep learning*, \$45k
2020–2021: Ocean Frontier Institute Visiting Fellowship, \$5k
2019: NVIDIA Accelerated Data Science GPU Grant, \$3k
2010–2012: The Villum Foundation Postdoc Fellowship – *Experiments in Nuclear Astrophysics With Radioactive Beams at the ISAC-II Facility at TRIUMF*, \$190k
2007: Foreign Graduate Student Invitation Program Grant, Tokyo Institute of Technology, Japan
2005: The Danish-American Fulbright Commission, \$17k

¹Grant amount in CAD

2005: Nordea Danmark-fonden, \$4k
 2005: Faculty of Science, Aarhus University, \$1.9k
 2005: Etatsråd CG Filtenborg og Hustru Marie Filtenborgs Studielegat, \$1.0k
 2005: Observator mag.scient Julie Marie Vinter Hansens Rejselegat, \$1.0k
 2002: International Physics Olympiad Honorable Mention

Publications

Over 40 peer-reviewed research articles (14 first authorships), 23 conference proceedings, and 3 feature articles; 585 citations and h -index of 13.² A few key publications are listed below. For a complete list, see page 4.

- O. S. Kirsebom, *et al.*, 2020. *Performance of a deep neural network at detecting North Atlantic right whale upcalls*, The Journal of the Acoustical Society of America **147**, 2636–2646. Citations: 5
- O. S. Kirsebom, *et al.*, 2019. *Discovery of an Exceptionally Strong β -Decay Transition of ^{20}F and Implications for the Fate of Intermediate-Mass Stars*, Physical Review Letters **123**, 262701. Citations: 11
- O. S. Kirsebom, *et al.*, 2018. *First Accurate Normalization of the β -delayed α Decay of ^{16}N and Implications for the $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$ Astrophysical Reaction Rate*, Physical Review Letters **121**, 142701. Citations: 6
- O. S. Kirsebom, *et al.*, 2012. *Improved Limit on Direct α Decay of the Hoyle State*, Physical Review Letters **108**, 202501. Citations: 58
- O. S. Kirsebom and B. Davids, 2011. *One Fewer Solution to the Cosmological Lithium Problem*, Physical Review C **84**, 058801. Citations: 37
- O. S. Kirsebom, *et al.*, 2011. *Precise and Accurate Determination of ^8B Decay Spectrum*, Physical Review C **83**, 065802. Citations: 20
- O. S. Kirsebom, *et al.*, 2010. *Breakup of ^{12}C Resonances into Three α Particles*, Physical Review C **81**, 064313. Citations: 56
- O. S. Kirsebom, *et al.*, 2009. *Observation of γ -Delayed 3α Breakup of the 15.11 and 12.71 MeV States in ^{12}C* , Physics Letters B **680**, 44–49. Citations: 22

Software

- 2020: *kadlu*, docs.meridian.cs.dal.ca/kadlu/, M. Smith and O. S. Kirsebom
- 2019: *ketos*, docs.meridian.cs.dal.ca/ketos/, F. Frazao and O. S. Kirsebom
- 2018: *simX*, [10.5281/zenodo.1320121](https://doi.org/10.5281/zenodo.1320121), M. Munch and J. H. Jensen and O. S. Kirsebom
- 2018: *Open R-matrix (ORM)*, [10.5281/zenodo.1174079](https://doi.org/10.5281/zenodo.1174079), M. Munch and O. S. Kirsebom and J. Refsgaard

Talks

Numerous (> 50) presentations at international conferences and workshops including several invited talks. For a complete list, see oliskir.github.io.

Spokespersonships

- 2015–2018: *Search for the 2nd-forbidden ground-state transition in the β decay of ^{20}F* , JYFL
- 2015–2018: *Absolute measurement of the $\beta\alpha$ decay of ^{16}N* , ISOLDE
- 2012–2015: *β -delayed α -decay study of ^{16}N using the implantation method*, KVI
- 2011–2015: *Lifetime Measurement of the 7.786 MeV State in ^{23}Mg* , TRIUMF

²Source: Web of Science, 2021.05.07.

Teaching

2013–2017: Extracurricular programme for 1st-year students, Coordinator
2015: Nuclear astrophysics graduate course, Lecturer
2014: Electromagnetism laboratory course, Coordinator
2006–2010: Physics and mathematics undergraduate courses, Teaching Assistant

Student Supervision

2020–2021: Santosh Medisetty, MSc Computer Science, Dalhousie University (Co-supervisor)
2019–2020: Xuhui Liu, MSc Computer Science, Dalhousie University (Co-supervisor)
2016–2017: Helle Bisgaard Sørensen, MSc Physics, Aarhus University (Principal supervisor)
2014–2015: Sofie Tilbæk Nielsen, BSc Physics, Aarhus University (Principal supervisor)

Conference and Workshop Organization

21–22 Nov 2019: Organizer of the workshop “**Detection and Classification in Marine Bioacoustics with Deep Learning**” with approx. 30 participants from Canada, the U.S. and Europe.

Academic Services

2016–2018: Member of the Liaison Committee at the Department of Physics and Astronomy, Aarhus University

Refereeing

Physics Review Letters, Physical Review C, The Astrophysical Journal, Journal of the Acoustical Society of America, Hyperfine Interactions, Methods in Ecology and Evolution.

Professional Memberships

2018–Present: Member of the Canadian Acoustical Association
2013–2018: Member of the Danish Physical Society

Publications

Research Articles

- N. J. Hubbard, C. A. Diget, S. P. Fox, H. O. U. Fynbo, A. M. Howard, O. S. Kirsebom, A. M. Laird, M. Munch, A. Parikh, M. Pignatari, and J. R. Tomlinson. *New Experimental $^{23}\text{Na}(, p)^{26}\text{Mg}$ Reaction Rate for Massive Star and Type Ia Supernova Models*. The Astrophysical Journal **912**, 59 (2021), URL <http://dx.doi.org/10.3847/1538-4357/abee91>
- B. Padovese, F. Frazao, O. S. Kirsebom, and S. Matwin. *Data augmentation for the classification of North Atlantic right whales upcalls*. The Journal of the Acoustical Society of America **149**, 2520–2530 (2021), URL <http://dx.doi.org/10.1121/10.0004258>
- O. S. Kirsebom, A. M. Howard, M. Munch, S. Sablok, J. A. Swartz, and H. O. U. Fynbo. *Experimental study of the $^{11}\text{B}(p, 3\alpha)\gamma$ reaction at $E_p = 0.5\text{--}2.7\text{ MeV}$* . The European Physical Journal A **56**, 179 (2020), URL <http://dx.doi.org/10.1140/epja/s10050-020-00183-z>
- O. S. Kirsebom, F. Frazao, Y. Simard, N. Roy, S. Matwin, and S. Giard. *Performance of a deep neural network at detecting North Atlantic right whale upcalls*. The Journal of the Acoustical Society of America **147**, 2636–2646 (2020), URL <http://dx.doi.org/10.1121/10.0001132>
- M. Munch, O. S. Kirsebom, J. A. Swartz, and H. O. U. Fynbo. *Resolving the $^{11}\text{B}(p, \alpha_0)$ cross-section discrepancies between 0.5 and 3.5 MeV*. The European Physical Journal A **56**, 17 (2020), URL <http://dx.doi.org/10.1140/epja/s10050-019-00016-8>
- O. S. Kirsebom, S. Jones, D. F. Strömberg, G. Martínez-Pinedo, K. Langanke, F. K. Röpke, B. A. Brown, T. Eronen, H. O. U. Fynbo, M. Hukkanen, A. Idini, A. Jokinen, A. Kankainen, J. Kostensalo, I. Moore, H. Möller, S. T. Ohlmann, H. Penttilä, K. Riisager, S. Rinta-Antila, P. C. Srivastava, J. Suhonen, W. H. Trzaska, and J. Äystö. *Discovery of an Exceptionally Strong β -Decay Transition of ^{20}F and Implications for the Fate of Intermediate-Mass Stars*. Phys. Rev. Lett. **123**, 262701 (2019), URL <http://dx.doi.org/10.1103/PhysRevLett.123.262701>
- O. S. Kirsebom, M. Hukkanen, A. Kankainen, W. H. Trzaska, D. F. Strömberg, G. Martínez-Pinedo, K. Andersen, E. Bodewits, B. A. Brown, L. Canete, J. Cederkäll, T. Enqvist, T. Eronen, H. O. U. Fynbo, S. Geldhof, R. de Groote, D. G. Jenkins, A. Jokinen, P. Joshi, A. Khanam, J. Kostensalo, P. Kuusiniemi, K. Langanke, I. Moore, M. Munch, D. A. Nesterenko, J. D. Ovejas, H. Penttilä, I. Pohjalainen, M. Reponen, S. Rinta-Antila, K. Riisager, A. de Roubin, P. Schotanus, P. C. Srivastava, J. Suhonen, J. A. Swartz, O. Tengblad, M. Vilen, S. Vinals, and J. Äystö. *Measurement of the $2^+ \rightarrow 0^+$ ground-state transition in the β decay of ^{20}F* . Phys. Rev. C **100**, 065805 (2019), URL <http://dx.doi.org/10.1103/PhysRevC.100.065805>
- B. Davids, M. Williams, N. E. Esker, M. Alcorta, D. Connolly, B. R. Fulton, K. Hudson, N. Khan, O. S. Kirsebom, J. Lighthall, and P. Machule. *Initial operation of the recoil mass spectrometer EMMA at the ISAC-II facility of TRIUMF*. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment **930**, 191–195 (2019), URL <http://dx.doi.org/https://doi.org/10.1016/j.nima.2019.03.070>
- O. S. Kirsebom, O. Tengblad, R. Lica, M. Munch, K. Riisager, H. O. U. Fynbo, M. J. G. Borge, M. Madurga, I. Marroquin, A. N. Andreyev, T. A. Berry, E. R. Christensen, P. D. Fernández, D. T. Doherty, P. Van Duppen, L. M. Fraile, M. C. Gallardo, P. T. Greenlees, L. J. Harkness-Brennan, N. Hubbard, M. Huyse, J. H. Jensen, H. Johansson, B. Jonson, D. S. Judson, J. Konki, I. Lazarus, M. V. Lund, N. Marginean, R. Marginean, A. Perea, C. Mihai, A. Negret, R. D. Page, V. Pucknell, P. Rahkila, O. Sorlin, C. Sotty, J. A. Swartz, H. B. Sørensen, H. Törnqvist, V. Vedia, N. Warr, and H. De Witte. *First Accurate Normalization of the β -delayed α Decay of ^{16}N and Implications for the $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$ Astrophysical Reaction Rate*. Physical Review Letters **121**, 142701 (2018), URL <http://dx.doi.org/10.1103/PhysRevLett.121.142701>

- M. Dahl, A. Brun, O. S. Kirsebom, and G. Andresen. *Improving Short-Term Heat Load Forecasts with Calendar and Holiday Data*. *Energies* **11**, 1678 (2018), URL <http://dx.doi.org/10.3390/en11071678>
- M. Munch, O. S. Kirsebom, J. A. Swartz, K. Riisager, and H. O. U. Fynbo. *Measurement of the full excitation spectrum of the ${}^7\text{Li}(p,\gamma)\alpha\alpha$ reaction at 441 keV*. *Physics Letters B* **782**, 779–784 (2018), URL <http://dx.doi.org/10.1016/j.physletb.2018.06.013>
- J. Refsgaard, H. O. U. Fynbo, O. S. Kirsebom, and K. Riisager. *Three-body effects in the Hoyle-state decay*. *Physics Letters B* **779**, 414–419 (2018), URL <http://dx.doi.org/10.1016/j.physletb.2018.02.031>
- V. Pesudo, M. J. G. Borge, A. M. Moro, J. A. Lay, E. Nácher, J. Gómez-Camacho, O. Tengblad, L. Acosta, M. Alcorta, M. A. G. Alvarez, C. Andreoiu, P. C. Bender, R. Braid, M. Cubero, A. D. Pietro, J. P. Fernández-García, P. Figuera, M. Fisichella, B. R. Fulton, A. B. Garnsworthy, G. Hackman, U. Hager, O. S. Kirsebom, K. Kuhn, M. Lattuada, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, C. Unsworth, and Z. M. Wang. *Scattering of the Halo Nucleus ${}^{11}\text{Be}$ on ${}^{197}\text{Au}$ at Energies around the Coulomb Barrier*. *Physical Review Letters* **118**, 152502 (2017), URL <http://dx.doi.org/10.1103/physrevlett.118.152502>
- M. V. Lund, A. Andreyev, M. J. G. Borge, J. Cederkll, H. D. Witte, L. M. Fraile, H. O. U. Fynbo, P. T. Greenlees, L. J. Harkness-Brennan, A. M. Howard, M. Huyse, B. Jonson, D. S. Judson, O. S. Kirsebom, J. Konki, J. Kurcewicz, I. Lazarus, R. Lica, S. Lindberg, M. Madurga, N. Marginean, R. Marginean, I. Marroquin, C. Mihai, M. Munch, E. Nacher, A. Negret, T. Nilsson, R. D. Page, S. Pascu, A. Perea, V. Pucknell, P. Rahkila, E. Rapisarda, K. Riisager, F. Rotaru, C. Sotty, M. Stanoiu, O. Tengblad, A. Turturica, P. V. Duppen, V. Vedia, R. Wadsworth, and N. Warr. *Beta-delayed proton emission from ${}^{20}\text{Mg}$* . *The European Physical Journal A* **52**, 304 (2016), URL <http://dx.doi.org/10.1140/epja/i2016-16304-x>
- K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. *Complete kinematical study of the 3α breakup of the 16.11 MeV state in ${}^{12}\text{C}$* . *The European Physical Journal A* **52**, 271 (2016), URL <http://dx.doi.org/10.1140/epja/i2016-16271-2>
- M. Munch, M. Alcorta, H. O. U. Fynbo, M. Albers, S. Almaraz-Calderon, M. L. Avila, A. D. Ayangeakaa, B. B. Back, P. F. Bertone, P. F. F. Carnelli, M. P. Carpenter, C. J. Chiara, J. A. Clark, B. DiGiovine, J. P. Greene, J. L. Harker, C. R. Hoffman, N. J. Hubbard, C. L. Jiang, O. S. Kirsebom, T. Lauritsen, K. L. Laursen, S. T. Marley, C. Nair, O. Nusair, D. Santiago-Gonzalez, J. Sethi, D. Seweryniak, R. Talwar, C. Ugalde, and S. Zhu. *Independent measurement of the Hoyle state β feeding from ${}^{12}\text{B}$ using Gammasphere*. *Physical Review C* **93**, 065803 (2016), URL <http://dx.doi.org/10.1103/physrevc.93.065803>
- O. S. Kirsebom, P. Bender, A. Cheeseman, G. Christian, R. Churchman, D. S. Cross, B. Davids, L. J. Evitts, J. Fallis, N. Galinski, A. B. Garnsworthy, G. Hackman, J. Lighthall, S. Ketelhut, P. Machule, D. Miller, S. T. Nielsen, C. R. Nobs, C. J. Pearson, M. M. Rajabali, A. J. Radich, A. Rojas, C. Ruiz, A. Sanetullaev, C. D. Unsworth, and C. Wrede. *Measurement of lifetimes in ${}^{23}\text{Mg}$* . *Physical Review C* **93**, 025802 (2016), URL <http://dx.doi.org/10.1103/physrevc.93.025802>
- J. Refsgaard, O. Kirsebom, E. Dijck, H. Fynbo, M. Lund, M. Portela, R. Raabe, G. Randisi, F. Renzi, S. Sami, A. Sytema, L. Willmann, and H. Wilschut. *Measurement of the branching ratio for β -delayed α decay of ${}^{16}\text{N}$* . *Physics Letters B* **752**, 296–301 (2016), URL <http://dx.doi.org/10.1016/j.physletb.2015.11.047>
- K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. *Unbound states in ${}^{12}\text{C}$ populated by γ -decay of the $(J^\pi, T) = (2^+, 1)$ 16.11 MeV state*. *The European Physical Journal A* **52**, 370 (2016), URL <http://dx.doi.org/10.1140/epja/i2016-16370-0>
- V. Margerin, G. Lotay, P. J. Woods, M. Aliotta, G. Christian, B. Davids, T. Davinson, D. T. Doherty, J. Fallis, D. Howell, O. S. Kirsebom, D. J. Mountford, A. Rojas, C. Ruiz, and J. A. Tostevin. *Inverse Kinematic Study of the ${}^{26}\text{Al}(d,p){}^{27}\text{Al}$ Reaction and Implications for Destruction of ${}^{26}\text{Al}$ in Wolf-Rayet and Asymptotic Giant Branch Stars*. *Physical Review Letters* **115**, 062701 (2015), URL <http://dx.doi.org/10.1103/physrevlett.115.062701>

- A. M. Howard, M. Munch, H. O. U. Fynbo, O. S. Kirsebom, K. L. Laursen, C. A. Diget, and N. J. Hubbard. $^{23}\text{Na}(\alpha, p)^{26}\text{Mg}$ Reaction Rate at Astrophysically Relevant Energies. *Physical Review Letters* **115**, 052701 (2015), URL <http://dx.doi.org/10.1103/physrevlett.115.052701>
- O. S. Kirsebom, H. O. U. Fynbo, K. Riisager, R. Raabe, and T. Roger. *Analysis of the response of silicon detectors to α particles and ^{16}O ions*. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* **758**, 57–61 (2014), URL <http://dx.doi.org/10.1016/j.nima.2014.05.005>
- K. L. Laursen, O. S. Kirsebom, H. O. U. Fynbo, A. Jokinen, M. Madurga, K. Riisager, A. Saastamoinen, O. Tengblad, and J. Äystö. *High-statistics measurement of the β -delayed α spectrum of ^{20}Na* . *The European Physical Journal A* **49**, 79 (2013), URL <http://dx.doi.org/10.1140/epja/i2013-13079-6>
- M. J. G. Borge, L. M. Fraile, H. O. U. Fynbo, B. Jonson, O. S. Kirsebom, T. Nilsson, G. Nyman, G. Possnert, K. Riisager, and O. Tengblad. *Rare βp decays in light nuclei*. *Journal of Physics G: Nuclear and Particle Physics* **40**, 035109 (2013), URL <http://dx.doi.org/10.1088/0954-3899/40/3/035109>
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, H. O. U. Fynbo, M. Madurga, and O. Tengblad. *Observation of α decay from a state in ^{10}B at 11.48 MeV*. *Physical Review C* **85**, 054308 (2012), URL <http://dx.doi.org/10.1103/physrevc.85.054308>
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, B. Jonson, M. Madurga, T. Nilsson, G. Nyman, K. Riisager, O. Tengblad, and M. Turrión. *Improved Limit on Direct α Decay of the Hoyle State*. *Physical Review Letters* **108**, 202501 (2012), URL <http://dx.doi.org/10.1103/physrevlett.108.202501>
- T. Roger, J. Büscher, B. Bastin, O. S. Kirsebom, R. Raabe, M. Alcorta, J. Äystö, M. J. G. Borge, M. Carmona-Gallardo, T. E. Cocolios, J. Cruz, P. Dendooven, L. M. Fraile, H. O. U. Fynbo, D. Galaviz, L. R. Gasques, G. S. Giri, M. Huyse, S. Hyldegaard, K. Jungmann, W. L. Kruithof, M. Lantz, A. Perea, K. Riisager, A. Saastamoinen, B. Santra, P. D. Shidling, M. Sohani, A. J. Sørensen, O. Tengblad, E. Traykov, D. J. van der Hoek, P. V. Duppen, O. O. Versolato, and H. W. Wilschut. *Precise Determination of the Unperturbed ^8B Neutrino Spectrum*. *Physical Review Letters* **108**, 162502 (2012), URL <http://dx.doi.org/10.1103/physrevlett.108.162502>
- M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Domínguez-Reyes, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, S. Hyldegaard, H. Jeppesen, B. Jonson, O. S. Kirsebom, M. Madurga, A. Maira, A. Muñoz-Martín, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, and M. Turrión. *Properties of ^{12}C resonances determined from the $^{10}\text{B}(^3\text{He}, p\alpha\alpha\alpha)$ and $^{11}\text{B}(^3\text{He}, d\alpha\alpha\alpha)$ reactions studied in complete kinematics*. *Physical Review C* **86**, 064306 (2012), URL <http://dx.doi.org/10.1103/physrevc.86.064306>
- O. S. Kirsebom and B. Davids. *One fewer solution to the cosmological lithium problem*. *Physical Review C* **84**, 058801 (2011), URL <http://dx.doi.org/10.1103/physrevc.84.058801>
- O. S. Kirsebom, H. O. U. Fynbo, A. Jokinen, M. Madurga, K. Riisager, A. Saastamoinen, O. Tengblad, and J. Äystö. *New β -delayed proton lines from ^{23}Al* . *The European Physical Journal A* **47**, 130 (2011), URL <http://dx.doi.org/10.1140/epja/i2011-11130-4>
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- E. Tengborn, A. M. Moro, T. Nilsson, M. Alcorta, M. J. G. Borge, J. Cederkäll, C. Diget, L. M. Fraile, H. O. U. Fynbo, J. Gomez-Camacho, H. B. Jeppesen, H. T. Johansson, B. Jonson, O. S. Kirsebom, H. H. Knudsen, M. Madurga, G. Nyman, A. Richter, K. Riisager, G. Schrieder, O. Tengblad, N. Timofeyuk, M. Turrión, D. Voulot, and F. Wenander. *The $^8\text{Li} + ^2\text{H}$ reaction studied in inverse kinematics at 3.15*

- MeV/nucleon using the REX-ISOLDE post-accelerator.* Physical Review C **84**, 064616 (2011), URL <http://dx.doi.org/10.1103/physrevc.84.064616>
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